

DAVID V. SCHAFFER

Professor
Chemical and Biomolecular
Engineering, Bioengineering,
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RESEARCH INTERESTS:

Our research program applies engineering principles to problems in cell biology and bioengineering. Our laboratory focuses on the related fields of stem cell biology and gene therapy. Specifically, we are studying investigating and engineering extracellular microenvironmental signals to control the behavior of pluripotent and neural stem cells. In parallel, we are working on the basic development of specific viral vectors to improve gene delivery vehicle performance for therapeutic applications, including stem cell-based therapies.

EDUCATION:

Stanford University

B.S. Chemical Engineering, June 1993 (with Distinction)

Massachusetts Institute of Technology

Ph.D. Chemical Engineering, April 1998 (Advisor: Douglas A. Lauffenburger)
Minor in Cell & Molecular Biology

Salk Institute for Biological Studies

Postdoctoral Fellowship, 1998-1999 (Advisor: Fred H. Gage)
Neural Stem Cells & Viral Gene Delivery Vehicles

POSITIONS:

1999-2005 Assistant Professor, Department of Chemical Engineering & Helen Wills Neuroscience Institute, U.C. Berkeley
2001- Faculty, Bioengineering Graduate Group, U.C. Berkeley
2005-2007 Associate Professor, Department of Chemical Engineering & Helen Wills Neuroscience Institute, U.C. Berkeley
2005- Chemist Scientist Faculty, Physical Biosciences Division, Lawrence Berkeley National Lab
2007- Professor, Department of Chemical and Biomolecular Engineering, Department of Bioengineering, & Helen Wills Neuroscience Institute, U.C. Berkeley
2014- Professor, Department of Chemical and Biomolecular Engineering, Department of Bioengineering, Department of Cell and Molecular Biology & Helen Wills Neuroscience Institute, U.C. Berkeley
2007-2009 Associate Director, Berkeley Stem Cell Center
2009-2011 Co-Director, Berkeley Stem Cell Center
2011- Director, Berkeley Stem Cell Center

AWARDS:

2017 American Institute of Chemical Engineers: Food, Pharmaceuticals and Biotechnology Award
2016- Faculty of 1000, Faculty Member in Stem Cells & Regeneration
2016 American Chemical Society Marvin Johnson Award
2014 Glenn Award for Research in Biological Mechanisms of Aging
2012 Distinguished Lindsey Lectureship, Texas A&M
2012 Eagleson Award & Lecture, American Biological Safety Association
2010 Fellow, American Institute of Medical and Biological Engineers
2010 American Institute of Chemical Engineers: Area 15 Plenary Award & Lecture
2008 Robert W. Vaughan Lectureship, California Institute of Technology
2006 American Chemical Society Biochemical Technology Division Young Investigator Award & Lecture
2005 Van Ness Award Lectureship, Rensselaer Polytechnic Institute
2003 Departmental Citation for Excellence in Teaching
2002 *Technology Review Magazine* "Top 100 Innovator Under 35" Award
2002 American Institute of Chemical Engineers (NorCal) Excellence in Teaching Award

2001 Hellman Family Faculty Award
 2001-2004 Whitaker Foundation Biomedical Engineering Research Award (Young Investigator)
 2001-2006 National Science Foundation CAREER Award
 2001-2004 Office of Naval Research Young Investigator
 2000 The Biomedical Engineering Society Rita Shaffer Young Investigator Award
 1999 Regents' Junior Faculty Award
 1998 NIH Postdoctoral Fellowship (Individual NRSA)
 1997 MIT Outstanding Seminar Award
 1993 National Science Foundation Graduate Fellowship (declined)
 1993 Whitaker Foundation Graduate Fellowship (declined)
 1993-1998 Fannie and John Hertz Foundation Graduate Fellowship

OTHER POSITIONS:

2002-2007 Editorial Board, *Journal of Biotechnology and Applied Biochemistry*
 2003- Editorial Board, *Biotechnology and Bioengineering*
 2004- Editorial Board, *International Journal of Neuroprotection and Neuroregeneration*
 2004- Advisory Board, Society for Biological Engineering
 2006-2010 National Institutes of Health Study Section, Biomaterials and Biointerfaces (BMBI)
 2009- Editorial Board, *Molecular Therapy*
 2011-2014 Treasurer and Board of Directors Member, American Society for Gene and Cell Therapy
 2012- Editorial Board, *Molecular Therapy Nucleic Acids*
 2013- Editorial Board, *Technology Journal*
 2013- Board of Associate Editors, *Cell and Molecular Bioengineering*
 2013- Editorial Board, *Brain Plasticity*
 2016- Editorial Board, *Advanced Biosystems*
 2016-2019 Secretary and Board of Directors Member, American Society for Gene and Cell Therapy
 2005-2016 Scientific and Technology Advisory Board, Bio-Rad Laboratories, Inc.
 2010-2013 Scientific Advisory Board, Veristem, Inc.
 2011-2014 Scientific Advisory Board, Cell Guidance Systems
 2011- Co-Founder, Valitor, Inc.
 2012-2014 Scientific Advisory Board, Avalanche, Inc.
 2012-2016 Scientific Advisory Board, Adheren, Inc.
 2013- Co-Founder and Acting CSO, 4D Molecular Therapeutics, Inc.
 2014- Board of Directors Member, uniQure Inc. (NASDAQ Symbol QURE)
 2016- Scientific Advisory Board Co-Chair, Ignite Immunotherapies, Inc.
 2000- Member, American Chemical Society
 1999- Member, American Institute of Chemical Engineers
 2003- Member, American Society for Gene and Cell Therapy
 2005- Member, American Society for Microbiology
 2010- Member, Biomedical Engineering Society
 2004- Member, Biophysical Society
 2010- International Society for Stem Cell Research

PUBLICATIONS:

1. Gramer, M.J., D.V. Schaffer, M.B. Sliwkowski, and C.F. Goochee (1994) "Purification and Purification and Characterization of an α -L-Fucosidase from Chinese Hamster Ovary Cell Culture Supernatant." ***Glycobiology***, 4:611-616.
2. Schaffer, D.V., R.L. Neve, and D.A. Lauffenburger (1996) "Use of Green Fluorescent Protein as a Reporter of Epidermal Growth Factor Receptor-Mediated Gene Delivery." ***Tissue Engineering***, 3:53-63.
3. Schaffer, D.V. and D.A. Lauffenburger (1998) "Optimization of Cell Surface Binding Enhances Efficiency and Specificity of Molecular Conjugate Gene Delivery." ***Journal of Biological Chemistry***, 273:28004-28009.
4. Lauffenburger, D.A. and D.V. Schaffer (1999) "The Matrix Delivers." ***Nature Medicine***, 5: 733-734.
5. Schaffer, D.V., N. Fidelman, N. Dan, and D.A. Lauffenburger (1999) "Vector Unpackaging as a Potential Barrier for Receptor-Mediated Polyplex Gene Delivery." ***Biotechnology & Bioengineering***, 67:598-606.
6. Schaffer, D.V. and D.A. Lauffenburger (2000) "Targeted Synthetic Gene Delivery Vectors." ***Current Opinion in Molecular Therapeutics***, 2: 155-161.
7. Mozaffari, M.S. and D.V. Schaffer (2001) "Taurine Modulates Arginine Vasopressin-Mediated Regulation of Renal Function." ***Journal of Cardiovascular Pharmacology***, 37(6): 742-750.
8. Kaspar, B.K., D. Erickson, D. Schaffer, L. Hinh, F.H. Gage, and D.A. Peterson (2002) "Targeted Retrograde Gene Delivery for Neuronal Protection." ***Molecular Therapy***, 5:50-6.

9. Kaspar, B.K., Vissel, B., Bengoechea, T., Crone, S., Randolph-Moore, L., Muller, R., Brandon, E.P., Schaffer, D., Verma, I.M., Lee, K.F., Heinemann, S.F., and F.H. Gage (2002) "Adeno-associated Virus Effectively Mediates Conditional Gene Modification in the Brain." ***Proceedings of the National Academy of Sciences USA***, 99:2320-5.
10. Wiewrodt, W., A.P. Thomas, L. Cipelletti, D.A. Weitz, S.I. Feinstein, D.V. Schaffer, S.M. Albelda, M. Koval, and V.R. Muzykantov (2002) "Size-Dependent Intracellular Immunotargeting into Endothelial Cells via a Surface Adhesion Molecule, PECAM-1," ***Blood***, 99:912-22.
11. Lai, K, B.K. Kaspar, F.H. Gage, and D.V. Schaffer (2003) "Sonic Hedgehog Regulates Adult Neural Progenitor Proliferation in Vitro and in Vivo." ***Nature Neuroscience***, 6(1):21-27.
12. Maheshri, N. and D.V. Schaffer (2003) "Computational and Experimental Analysis of DNA Shuffling." ***Proceedings of the National Academy of Sciences USA***, 100:3071-3076.
13. Weinberger, L., D.V. Schaffer (corresponding author), and A.P. Arkin (corresponding author) (2003) "Theoretical Design of a Gene Therapy to Prevent AIDS but Not HIV-1 Infection." ***Journal of Virology***, 77:10028-10036.
14. Schaffer, D.V. and F.H. Gage (2004) "Neurogenesis and Neuroadaptation," ***Neuromolecular Medicine***, 5:1-9.
15. Ignowski, J. and D.V. Schaffer (2004) "Kinetic Analysis and Modeling of Firefly Luciferase as a Quantitative Reporter Gene in Live Mammalian Cells." ***Biotechnology & Bioengineering***, 86(7):827-34.
16. Lai, K., M.J. Robertson, and D.V. Schaffer (2004) "The Sonic Hedgehog Signaling System as a Bistable Genetic Switch." ***Biophysical Journal***, 86:2748-2757.
17. O'Neill, A. and D.V. Schaffer (2004) "The Biology and Engineering of Stem Cell Control." ***Biotechnology & Applied Biochemistry***, 40:5-16.
18. Leonard, J. and D.V. Schaffer (2005) "Computational Design of RNA Interference Strategies that Resist HIV Escape." ***Journal of Virology***, 79:1645-1654.
19. Agrawal, S. and D.V. Schaffer (2005) "In Situ Stem Cell Therapy: Novel Targets, Familiar Challenges." ***Trends in Biotechnology***, 23:78-83.
20. Lee, G., Maheshri, N., Kaspar, B.K., and D.V. Schaffer (2005) "PEG Conjugation Moderately Protects Adeno-Associated Viral Vectors Against Antibody Neutralization." ***Biotechnology & Bioengineering***, 92:24-34.
21. Schaffer, D.V. and W.C. Zhou (2005) "Gene Therapy and Gene Delivery Systems as Future Human Therapeutics." ***Advances in Biochemical Engineering & Biotechnology***, 99:1-5.
22. Yu, J. and D.V. Schaffer (2005) "Advanced Targeting Strategies for Murine Retroviral and Adeno-Associated Viral Vectors." ***Advances in Biochemical Engineering & Biotechnology***, 99:147-167.
23. Weinberger, L.S., J.C. Burnett, J.E. Toetcher, A.P. Arkin, and D.V. Schaffer (2005) "Stochastic Gene Expression in a Lentiviral Feedback Loop: HIV-1 Tat Expression Drives Phenotypic Diversity." ***Cell***, 122:169-182.
24. Leonard, J. and D.V. Schaffer (2006) "Antiviral RNAi Therapy: Emerging Approaches for Hitting a Moving Target." ***Gene Therapy***, 13:532-540.
25. Abranches, E., O'Neill, A., Robertson, M.J., Schaffer, D.V. (corresponding author), and J. Cabral (2006) "Development of Quantitative PCR Methods to Analyze Adult Neural Progenitor Cell Culture State." ***Biotechnology & Applied Biochemistry***, 44:1-8.
26. Maheshri, N., J.T. Koerber, B. Kaspar, and D.V. Schaffer (2006) "Directed Evolution of Adeno-Associated Virus Yields Enhanced Gene Delivery Vectors." ***Nature Biotechnology***, 24:198-204.
27. Saha, K. and D.V. Schaffer (2006) "Signaling Dynamics in Sonic Hedgehog Tissue Patterning." ***Development***, 133:889-900.
28. Yu, J. and D.V. Schaffer (2006) "Selection of Novel Vesicular Stomatitis Virus Glycoprotein Variants from a Peptide Insertion Library for Enhanced Purification of Retroviral and Lentiviral Vectors." ***Journal of Virology***, 80:3285-3292.
29. Greenberg K.P., E.S. Lee, D.V. Schaffer, and J.G. Flannery (2006) "Gene Delivery to the Retina Using Lentiviral Vectors." ***Advances in Experimental Medicine and Biology***, 572: 255-266.
30. Koerber, J.T., N. Maheshri, B.K. Kaspar, and D.V. Schaffer (2006) "Construction of Diverse Adeno-Associated Viral Libraries for Directed Evolution of Enhanced Gene Delivery Vehicles." ***Nature Protocols***, 1:701-706.
31. Jang, J-H. and D.V. Schaffer (2006) "Microarraying the Cellular Microenvironment." ***Molecular Systems Biology***, 2:39.
32. Yu, J.H. and D.V. Schaffer (2006) "High-Throughput, Library-Based Selection of a Murine Leukemia Virus to Infect Nondividing Cells." ***Journal of Virology***, 80:8981-8988. *Selected as a Journal of Virology Spotlight Article.*
33. Saha, K., E.F. Irwin, J. Kozhukh, D.V. Schaffer (co-corresponding author), and K.E. Healy (2007) "Biomimetic Interfacial Interpenetrating Polymer Networks Control Neural Stem Cell Behavior." ***Journal of Biomedical Materials Research Part A***, 81:240-249.

34. Greenberg, K.P., S.F. Geller, D.V. Schaffer, and J.G. Flannery (2006) "Targeted Transgene Expression in Müller Glia of Normal and Diseased Retinas Using Lentiviral Vectors." *Investigative Ophthalmology & Visual Science*, 48:1844-1852.
35. Leonard, J.N., P. Ferstl, A. Delgado, and D.V. Schaffer (2007) "Enhanced Preparation of Adeno-Associated Viral Vectors by Using High Hydrostatic Pressure to Selectively Inactivate Helper Adenovirus." *Biotechnology & Bioengineering*, 97:1170-1179. *Selected as a Journal Spotlight Article.*
36. Koerber, J.T., J-H. Jang, and D.V. Schaffer (2007) "Engineering Adeno-Associated Virus for One Step Purification via Immobilized Metal Affinity Chromatography." *Human Gene Therapy*, 18:367-378.
37. Peltier, J., A. O'Neill, and D.V. Schaffer (2007) "PI3K/Akt and CREB Regulate Adult Neural Hippocampal Progenitor Proliferation and Differentiation." *Developmental Neurobiology*, 67:1348-1361.
38. Ho, J.E., E.H. Chung, S. Wall, D.V. Schaffer, and K.E. Healy (2007) "Immobilized Sonic Hedgehog N-Terminal Signaling Domain Enhances Differentiation of Bone Marrow-Derived Mesenchymal Stem Cells." *Journal of Biomedical Materials Research Part A*, 83A:1200-1208.
39. Saha, K., J. Pollock, D.V. Schaffer (co-corresponding author), and K.E. Healy (2007) "Designing Synthetic Materials to Control Stem Cell Phenotype." *Current Opinion in Chemical Biology*, 11:381-387.
40. Jang, J-H., K-I. Lim, and D.V. Schaffer (2007) "Library Selection and Directed Evolution Approaches to Engineering Targeted Viral Vectors." *Biotechnology & Bioengineering*, 98:515-524.
41. Ashton, R.S., J. Peltier, C.A. Fasano, A. O'Neill, J. Leonard, S. Temple, D.V. Schaffer (co-corresponding author), and R.S. Kane (2007) "High-Throughput Screening of Gene Function in Stem Cells Using Clonal Microarrays." *Stem Cells*, 25:2928-2935.
42. Ashton, R.S., A. Banerjee, S. Punyani, D.V. Schaffer, and R.S Kane (2007) "Scaffolds Based on Degradable Alginate Hydrogels and Poly(lactide-co-glycolide) Microspheres for Stem Cell Culture Biomaterials." *Biomaterials*, 28:5518-5525.
43. Robertson, M.J., P. Gip, and D.V. Schaffer (2008) "Neural Stem Cell Engineering: Directed Differentiation of Adult and Embryonic Stem Cells into Neurons." *Frontiers in Bioscience*, 13:21-50 (PMID: 17981526).
44. Kwon, I. and D.V. Schaffer (2008) "Designer Gene Delivery Vectors: Molecular Engineering and Evolution of Adeno-Associated Viral Vectors for Enhanced Gene Transfer." *Pharmaceutical Research*, 25:489-499.
45. Ricci, C., V. Pastukh, J. Leonard, J. Turrens, G. Wilson, D. Schaffer, and S.W. Schaffer (2008) "Mitochondrial DNA Damage Triggers Mitochondrial Superoxide Generation and Apoptosis." *American Journal of Physiology*, 294:C413-22 (PMID: 18077603).
46. Lim, K-I., and D.V. Schaffer (2008) "Library Selection Approaches to Engineering Enhanced Retroviral and Lentiviral Vectors." *Combinatorial Chemistry and High Throughput Screening*, 11:111-117 (PMID: 18336204).
47. Schaffer, D.V. (corresponding author), J.T. Koerber, and K.-I. Lim (2008) "Molecular Engineering of Viral Gene Delivery Vehicles." *Annual Reviews in Biomedical Engineering*, 10:169-94 (PMID: 18647114).
48. Wall, S., K. Saha, R. Aston, K. Kam, D.V. Schaffer, and K.E. Healy (2008) "Multivalency of Sonic Hedgehog Conjugated to Linear Polymer Chains Modulates Protein Potency." *Bioconjugate Chemistry*, 19:806-812 (PMID: 18380472).
49. Little, L., K.E. Healy, and D.V. Schaffer (2008) "Engineering Biomaterials for Synthetic Neural Stem Cell Microenvironments." *Chemical Reviews*, 108:1787-1796 (PMID: 18476674).
50. Koerber, J.T. and D.V. Schaffer (2008) "Transposon-Based Mutagenesis Generates Diverse Adeno-Associated Viral Libraries with Novel Gene Delivery Properties." *Methods in Molecular Biology*, 434:161-170 (PMID: 18470644).
51. Koerber, J.T., J-H. Jang, and D.V. Schaffer (2008) "DNA Shuffling of Adeno-Associated Virus Yields Functionally Diverse Viral Progeny." *Molecular Therapy*, 16:1703-9 (PMID: 18728640).
52. Eshghi, S. and D.V. Schaffer (2008) "Engineering Microenvironments to Control Stem Cell Fate and Function." *Stembook*, D. Melton, ed. (www.stembook.org).
53. Saha, K., A.J. Keung, E.F. Irwin, Y. Li, D.V. Schaffer (co-corresponding author), and K.E. Healy (2008) "Substrate Modulus Directs Neural Stem Cell Behavior." *Biophysical Journal*, 95:4426-38 (PMID: 18658232).
54. Leonard, J.N., P.S. Shah, J.C. Burnett, and D.V. Schaffer (2008) "HIV Evades RNA Interference Directed at TAR by an Indirect Compensatory Mechanism." *Cell Host and Microbe*, 4:484-94 (PMID: 18996348). *Selected as the Featured Article.*
55. Burnett, J.C., K. Miller-Jensen, P.S. Shah, A.P. Arkin, and D.V. Schaffer (2009) "Control of Stochastic Gene Expression by Host Factors at the HIV Promoter." *Public Library of Science (PLoS) Pathogens*, 5(1) (PMID: 19132086).
56. Excoffon, K.J., J.T. Koerber, D.D. Dickey, M. Murtha, S. Keshavjee, B.K. Kaspar, J. Zabner, and D.V. Schaffer (2009) "Directed Evolution of Adeno-Associated Virus to an Infectious Respiratory Virus." *Proceedings of the National Academy of Sciences USA*, 106:3865-3870 (PMID: 19237554).

57. Agrawal, S., C. Archer, and D.V. Schaffer (2009) "Computational Models of the Notch Network Elucidate Mechanisms of Context-dependent Signaling." *Public Library of Science (PLoS) Computational Biology*, 5:e1000390 (PMID: 19468305).
58. Banerjee, A., M. Arhaa, S. Choudhary, R.S. Ashton, S.R. Bhatia, D.V. Schaffer, and R.S. Kane (2009) "The Influence of Hydrogel Modulus on the Proliferation and Differentiation of Encapsulated Neural Stem Cells." *Biomaterials*, 30:4695-9 (PMID: 19539367).
59. Dalkara, D., K.D. Kolstad, N. Caporale, M. Visel, R.R. Klimczak, D.V. Schaffer, and J.G. Flannery (2009) "Inner Limiting Membrane Barriers to AAV Mediated Retinal Transduction from the Vitreous." *Molecular Therapy*, 17:2096-2102 (PMID: 19672248).
60. Koerber, J.T., R. Klimczak, D. Dalkara, J.G. Flannery, and D.V. Schaffer (2009) "A Novel Adeno-Associated Viral Variant for Efficient and Selective Intravitreal Transduction of Rat Müller Cells." *Public Library of Science (PLoS) ONE*, 4:e7467 (PMID: 19826483).
61. Carlson, M.E., M.J. Conboy, M. Hsu, L. Barchas, J. Jeong, A. Agrawal, A.J. Mikels, S. Agrawal, D.V. Schaffer, and I.M. Conboy (2009) "Relative Roles of TGF- β 1 and Wnt in the Systemic Regulation and Aging of Satellite Cell Responses." *Aging Cell*, 8:676-689 (PMID: 19732043).
62. Koerber, J.T., R. Klimczak, J-H. Jang, D. Dalkara, J.G. Flannery, and D.V. Schaffer (2009) "Molecular Evolution of Adeno-Associated Virus for Enhanced Glial Gene Delivery." *Molecular Therapy*, 17: 2088-2095 (PMID: 19672246).
63. Meng, Y., S. Eshghi, Y. Li, R. Schmidt, D.V. Schaffer, and K.E. Healy (2009) "Characterization of Integrin Engagement during Defined Human Embryonic Stem Cell Culture." *FASEB Journal*, 24:1056-1065 (PMID 19933311).
64. Peltier, J. and D.V. Schaffer (2010) "Systems Biology Approaches to Understanding Stem Cell Fate Choice." *IET Systems Biology*, 4:1-11 (PMID 20001088).
65. Vazin, T. and D.V. Schaffer (2010) "Engineering Strategies to Emulate the Stem Cell Niche." *Trends in Biotechnology*, 28:117-124 (PMID 20042248). *Selected as the Cover Article.*
66. Peltier, J., B.K. Ormerod, and D.V. Schaffer (2010) "Isolation of Adult Hippocampal Neural Progenitors." *Methods in Molecular Biology*, 621:57-63 (PMID 20405359).
67. Peltier, J., S. Agrawal, M.J. Robertson, and D.V. Schaffer (2010) "In Vitro Culture and Analysis of Adult Hippocampal Neural Progenitors." *Methods in Molecular Biology*, 621:65-87 (PMID 20405360).
68. Robertson, M.J., J. Peltier, and D.V. Schaffer (2010) "In Vivo Analysis of Engrafted Adult Hippocampal Neural Progenitors." *Methods in Molecular Biology*, 621:89-102 (PMID 20405361).
69. Peltier, J. and D.V. Schaffer (2010) "Viral Packaging and Transduction of Adult Hippocampal Neural Progenitors." *Methods in Molecular Biology*, 621:103-116 (PMID 20405362).
70. Kolstad, K.D., D. Dalkara, K. Guerin, M. Visel, N. Hoffmann, D.V. Schaffer, and J.G. Flannery (2010) "Changes to AAV Mediated Gene Delivery in Retinal Degeneration." *Human Gene Therapy*, 21:571-578 (PMID 20021232).
71. Kurpinski, K., H. Lam, J. Chu, A. Kim, E. Tsay, S. Agrawal, D.V. Schaffer, A. Winoto, and S. Li (2010) "Notch Signaling Mediates Stem Cell Differentiation into Smooth Muscle Cells." *Stem Cells*, 28:734-742 (PMID 20146266).
72. Burnett, J.C., K.I. Lim, A. Calafi, J.J. Rossi, D.V. Schaffer (co-corresponding author), A.P. Arkin (2010) "Combinatorial Latency Reactivation for HIV-1 Subtypes and Variants." *Journal of Virology*, 84:5958-5974 (PMID 20357084).
73. Shah, P.S. and D.V. Schaffer (2010) "Gene Therapy Takes a Cue from HAART: Combinatorial Antiviral Therapeutics Reach the Clinic." *Science Translational Medicine*, 2:36ps30 (PMID 20555021).
74. Jang, J-H., J.T. Koerber, K. Gujraty, S.R. Bethi, R.S. Kane, and D.V. Schaffer (2010) "Surface Immobilization of Hexa-histidine-tagged Adeno-associated Viral Vectors for Localized Gene Delivery." *Gene Therapy*, 17:1384-1389 (PMID 20508598).
75. Lim, K-I., R.R. Klimczak, J.H. Yu, and D.V. Schaffer (2010) "Specific Insertions of Zinc Finger Domains into Gag-Pol Yields Engineered Retroviral Vectors with Selective Integration Properties." *Proceedings of the National Academy of Sciences USA*, 107:12475-12480 (PMID 20616052).
76. Aviran, S., P.S. Shah, D.V. Schaffer, and A.P. Arkin (2010) "Computational Models of HIV-1 Resistance to Gene Therapy Elucidate Therapy Design Principles." *Public Library of Science (PLoS) Computational Biology*, 6:e1000883 (PMID 20711350).
77. Keung, A.J., K.E. Healy, S. Kumar, and D.V. Schaffer (2010) "Biophysics and Dynamics of Natural and Engineered Stem Cell Microenvironments." *Wiley Interdisciplinary Reviews (WIREs): Systems Biology and Medicine*, 2:49-64 (PMID 20836010).
78. Schaffer, D.V. (2010) "Microarraying for Mechanosensitivity." *Cell Stem Cell*, 7:273-4 (PMID 20804961).
79. Ananthanarayanan, B., L. Little, D.V. Schaffer, K.E. Healy, and M. Tirrell (2010) "Neural Stem Cell Adhesion and Proliferation on Phospholipid Bilayers Functionalized with RGD Peptides." *Biomaterials*, 31:8706-15 (PMID 20728935).

80. Keung, A.J., S. Kumar, and D.V. Schaffer (2010) "Presentation Counts: Microenvironmental Regulation of Stem Cells by Biophysical and Material Cues." *Annual Reviews in Cell and Developmental Biology*, 26:533-556 (PMID 20590452).
81. Skupsky, R., J.C. Burnett, J.E. Foley, D.V. Schaffer (co-corresponding author), and A.P. Arkin (2010) "HIV Promoter Integration Site Primarily Modulates Transcriptional Burst Size Rather Than Frequency." *Public Library of Science (PLoS) Computational Biology*, 6:e1000952 (PMID 20711350).
82. Willerth, S.M., H.A.M. Pedro, L. Pachter, L.M. Humeau, A.P. Arkin, and D.V. Schaffer (2010) "Development of a Low Bias Method for Characterizing Viral Populations Using Next Generation Sequencing Technology." *Public Library of Science (PLoS) ONE*, 5:e13564 (PMID 21042592).
83. Saha, K., J. Kim, E. Irwin, J. Yoon, F. Momin, V. Trujillo, D.V. Schaffer, K.E. Healy, and R.C. Hayward (2010) "Surface Creasing Instability of Soft Polyacrylamide Cell Culture Substrates." *Biophysical Journal*, 99:L94-96 (PMID 21156124).
84. Little, L., K. Dane, P.S. Daugherty, K.E. Healy, and D.V. Schaffer (2011) "Exploiting Bacterial Peptide Display Technology to Engineer Biomaterials for Neural Stem Cell Culture." *Biomaterials*, 32:1484-1494 (PMID 21129772).
85. Dickinson, B.C., J. Peltier, D. Stone, D.V. Schaffer (co-corresponding author), and C.J. Chang (2011) "Nox2 Redox Signaling Maintains Essential Cell Populations in the Brain." *Nature Chemical Biology*, 7:106-112 (PMID 21186346).
86. Arkin, A.P. and D.V. Schaffer (2011) "Network News: Innovations in 21st Century Systems Biology." *Cell*, 144:844-849 (PMID 21414475).
87. Jang, J-H., J.T. Koerber, J-S. Kim, P. Asuri, T. Vazin, M. Bartel, A. Keung, I. Kwon, K.I. Park, and D.V. Schaffer (2011) "An Evolved Adeno-Associated Viral Variant Enhances Gene Delivery and Gene Targeting in Neural Stem Cells." *Molecular Therapy*, 19:667-675 (PMID 21224831).
88. Yin, Y., K. Greenberg, J.J. Hunter, D. Dalkara, K.D. Kolstad, B.D. Masella, R. Wolfe, M. Visel, D. Stone, R.T. Libby, D. DiLoreto, Jr., D. Schaffer, J. Flannery, D.R. Williams, W.H. Merigan (2011) "Intravitreal Injection of AAV2 Transduces Macaque Inner Retina." *Investigative Ophthalmology and Visual Science*, 52:2775-2783 (PMID 21310920).
89. Peltier, J., A. Conway, A. Keung, and D.V. Schaffer (2011) "Akt Increases Sox2 Expression in Adult Hippocampal Neural Progenitor Cells but Increased Sox2 does not Promote Proliferation." *Stem Cells and Development*, 20:1153-1161 (PMID 21028992).
90. Chen, S., N. Patel, D.V. Schaffer, and M.M. Maharbiz (2011) "Trap and Corral: A Two-step Approach for Constructing and Constraining Dynamic Cell Contact Events in Differentiating Progenitor Cell Populations." *Journal of Micromechanics and Microengineering*, 5:054027.
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